

CLAIMS

1. Crinkling device for a wrapping machine, designed to adjust the width of a foil web (1) to be wrapped around an object between a full first web width (W_1) and a substantially narrow reduced second web width (W_2), said crinkling device comprising
- a frame (2) connected to a foil dispenser comprised in the wrapping machine, said foil dispenser carrying a foil web roll of foil web (1) having a longitudinal upper edge (3) and a longitudinal lower edge (4),
 - a first wheel (5) rotatably mounted on the frame (2),
 - a second wheel rotatably mounted on the frame (2) at a distance from the first wheel (5),
 - an endless drive element (7), which is passed over the first wheel (5) and the second wheel (6), forming a first drive element portion (8) and a second drive element portion (9), said portions extending adjacently and parallel to each other between the wheels in the widthwise direction of the foil web,
 - a power means (10) for moving the drive element (7) optionally in a first running direction (11) with the first drive element portion (8) moving upwards and the second drive element portion (9) moving downwards, and in an opposite second running direction (12) with the first drive element portion (8) moving downwards and the second drive element portion (9) moving upwards.
 - a first carriage (13), which is fastened to the first drive element portion (9) and guided in the frame (2) so as to be movable in the widthwise direction of the foil web,
 - a first crinkling element (14), which is mounted on the first carriage (13) for crinkling the upper edge (3) of the foil web,

- a second crinkling element (15), which is movable by the action of the drive element (7) in the widthwise direction of the foil web (1) for crinkling the lower edge (4) of the foil web, characterized in that the crinkling device comprises

5 - a slide rod (16), to which the second crinkling element (15) is fastened and which is guided in the frame (2) so as to be movable in a substantially vertical direction between a lower position (L), in which the second crinkling element (15) is out of contact with the lower edge (4) of the foil web (1), and an upper position (U), in which the second crinkling element (15) deflects the lower edge (4) of the foil web (1) upwards so as to crinkle it, said slide rod being arranged to return towards the lower position (L) when not exposed to a force acting in the upward direction;

- first coupling means (17¹, 18¹) for forming a releasable coupling between the slide rod (16) and the first drive element portion (8) when the drive element (7) is running in the first direction (11) to move the second crinkling element (15) to the upper position (U); and

25 - second coupling means (17², 18²) for forming a releasable coupling between the slide rod (16) and the second drive element portion (9) when the drive element (7) is running in the second direction (12) to move the second crinkling element (15) to the upper position (U);

30 so that, by driving the drive element (7) in the first running direction (11), the foil web (1) can only be crinkled from its lower edge (4), and

by driving the drive element (7) in the second running direction (12), the foil web (1) can be crinkled optionally either from the upper edge (3) without crinkling the lower edge (4) or from the upper edge (3) and the lower edge (4) simultaneously.

2. Crinkling device according to claim 1, characterized in that the first coupling means (17¹, 18¹) comprise

5 - a first dog (17¹) connected to the slide rod (15) near the upper end, and

- a second dog (18¹), which is connected to the first carriage (13) and fitted to come into contact with the first dog (17) when the drive element (7) is running in the first direction (11).

10 3. Crinkling device according to claim 1 or 2, characterized in that the crinkling device comprises a second carriage (21), which is fastened to the second drive element portion (9) and guided in the frame (2) so as to be movable in the widthwise direction of the foil web (1).

4. Crinkling device according to claim 3, characterized in that the second coupling means (17², 18²) comprise

20 - a third dog (17²), which is connected to the slide rod (16) near the upper end, and

- a fourth dog (18²), which is connected to the second carriage (21) and fitted to come into contact with the third dog (17²) when the drive element (7) is running in the second direction (12).

25 5. Crinkling device according to claim 1 or 2, characterized in that the slide rod (16) comprises a straight rod part (19) mounted in the frame (2) by means of guide elements (20) placed between the first drive element portion (8) and the second drive element portion (9).

30 6. Crinkling device according to claim 5, characterized in that the slide rod (16) is so mounted in the frame (2) that the slide rod will be returned to the lower position (L) by the action of gravitation.

7. Crinkling device according to any one of claims 1 - 6, characterized in that a return

spring (25) is provided between the slide rod (16) and the frame (2) for returning the slide rod to the lower position (L).

8. Crinkling device according to any one of
5 claims 1 - 6, characterized in that the power means (10) is a motor arranged to drive the first wheel (5) or the second wheel (6).

9. Crinkling device according to any one of
10 claims 1 - 8, characterized in that the crinkling device comprises detectors (22, 23, 24) for detecting the position of the carriages (13, 21) and controlling the power means (10) on that basis to stop the motion of the drive element (7) and to change its running direction.

15 10. Crinkling device according to claim 9 or 10, characterized in that the detectors (22, 23, 24) are proximity sensors having a first state (0) and a second state (1); and that the detectors (22, 23, 24) have been fitted to change their state between
20 the first and second states when the first carriage (13) and/or the second carriage (21) is within the detection distance of the detector.